National Institute of Environmental Health Sciences

Effects of weather on pedometer-determined physical activity in children

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Abstract:

The effects of weather conditions on children's physical activity have not been well described. PURPOSE: To evaluate the effects of meteorological variables on the number of pedometer steps accumulated by children. METHODS: Between August and December 2004 (winter to summer), 1115 Auckland children (536 boys, 579 girls; aged 5-12 yr) from 27 socioeconomically and ethnically diverse schools wore sealed multiday memory pedometers for five consecutive days (three weekdays and two weekend days). Values of daily (7 a.m. to 7 p.m.) mean ambient temperature, mean wind speed, precipitation, and duration of bright sunshine were obtained from local meteorological stations. The independent effects of each of these variables on step counts were estimated using composite mixed linear models. Effects were standardized for interpretation of magnitudes. RESULTS: Weekday and weekend-day step counts for boys were 16,100 +/- 5000 and 12,900+/- 5900 (mean +/- SD), whereas those for girls were 14,200 +/- 4200 and 11,300 +/- 4800. A 10 degrees C rise in mean ambient temperature was associated with a small increase in weekday steps [1700; 90% confidence intervals (CI) +/-1300] and a moderate increase in weekend-day steps (3400; 90% CI +/-1500) for boys, whereas for girls the effects were small (2300; 90% CI +/-1000) and unclear (-300; 90% CI +/-1200), respectively. There were substantial decreases in weekday and weekend-day steps during moderate rainfall (1.1-4.9 mm) for both sexes. Most effects of day length, wind speed, and hours of bright sunshine on step counts were trivial or unclear. CONCLUSIONS: Ambient temperature and rainfall have substantial effects on children's daily step counts and should therefore be considered when comparing physical activity across different locations or periods. Strategies to increase activity on cold or rainy days may also be appropriate.

Source: http://dx.doi.org/10.1249/MSS.0b013e31816e2b28

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Precipitation, Solar Radiation, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Australasia

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Diabetes/Obesity, Other Health Impact

Cardiovascular Effect: Other Cardiovascular Effect

Cardiovascular Disease (other): Hypertension

Other Health Impact: Physical Activity

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified